

53. (Amended) The quantum register of claim 8, wherein a plurality of qubits is formed by the plurality of mesoscopic islands, the bank, and the plurality of clean Josephson junctions, and wherein each quantum state on each respective qubit in said plurality of qubits is characterized by a clockwise or a counterclockwise supercurrent that circulates in a plane in the vicinity of the Josephson junction in said respective qubit.

54. (Amended) The qubit of claim 28, wherein each quantum state on the qubit is characterized by a clockwise or a counterclockwise supercurrent that circulates in a plane in the vicinity of the clean Josephson junction.

55. (Amended) The quantum register of claim 39, wherein a qubit is formed by each mesoscopic island in the at least one mesoscopic island together with the first bank and a Josephson junction in the at least one Josephson junction, and wherein each quantum state of each said qubit is characterized by a clockwise or a counterclockwise supercurrent that circulates in a plane in the vicinity of the Josephson junction in said qubit.